drinking water is of prime importance.

Nitrate infiltrates, from soils under intensive agricultural use or other sources, into groundwater and therefore in many cases into drinking water resources. An estimation of the Mean Residence Time (MRT) of groundwater as well as an investigation of the natural hydrological facts concerning groundwater recharge is possible by isotope-hydrology measurements (oxygen-18, tritium etc.) if there is no anthropogenic tritium contamination (e.g. waste disposal sites, water treatment plants etc.) or infiltration of river waters enriched in tritium.

From the commonly available methods to determine Mean Residence Times (MRT < 50 yrs) of waters for research and practical purposes, the following methods were tested (Kralik et al. 2008):

1) Variation of the oxygen-18 isotopes
2) Tritium-model ages as routine method as well as
3) Tritium/Helium-3 ($^3H/^3He$) and
4) Chlorinated Fluor-Carbons (CFC) measurements

The main purpose was to obtain a statistical overview of the MRTs in the first few metres of the frequently used uppermost aquifer. Five standard monitoring wells of the Parndorfer Platte and the Traun Enns Platte were analysed by the Isotope Hydrology Section of the IAEA for CFC and $^3H/^3He$ concentrations.

Investigations in the groundwater body **Parndorfer Platte** (Häusler 2007) included all six monitoring wells of the Austrian Water Quality Monitoring System (GZÜV). Thus, on a quarterly basis, 24 groundwater samples were collected and analysed. Four monitoring wells (67 %) show MRTs between 15-30 years and two monitoring wells (33 %) at the eastern border indicate MRT > 50 years. However, there is no simple relation between MRT and the nitrate or pesticide content. From the calculated MRTs it is evident that measures taken now to improve the groundwater quality will in most monitoring wells not show effects in a few years' time. However, monitoring wells with short MRTs can be used to test groundwater quality improvements within a short time period.

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Tectonothermal evolution of a Jurassic suture zone in the Greek Rhodope

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A Jurassic suture zone in the Greek Rhodope is studied in terms of structures, petrology and age. It represents a widely dispersed agglomerate of rocks which experienced continuous deformation and metamorphism from Early Jurassic to Late Cretaceous recorded in metapelites, metabasites and metaperidotites. The suture zone is located between a lower plate of Carboniferous/ Permian and an upper plate of Late Jurassic gneisses. On the basis of different temperature conditions in the footwall compared to the hangingwall, the suture zone itself is divided into an upper and a lower subunit which experienced coherent deformation stages. A geodynamic scenario for the Greek Rhodope describes continuous subduction and related magmatism in the Mid Jurassic and in the Late Cretaceous. Variscan basement was detached from the European plate and experienced together with Permian oceanic rocks intense deformation and metamorphism close to ultra-high-pressure level at ≥180 Ma. The studied rocks define buoyant slivers which exhumed along the subduction thrust pathways as result of slab breakoff in the Late Jurassic. Hangingwall units of the suture zone were positioned at the base of the upper plate and experienced coaxial geometries and thermal reequilibration. Subsequent and final exhumation was due to high-grade SW-vergent shearing followed by low-angle NE-vergent normal faulting on-top of the exhuming wedge. The final architecture of the Greek Rhodope results from thermal overprints in the Tertiary and the formation of a southward propagating core complex in a back-arc position.

Type locality of the Hochreith Formation as part of the Lower Cretaceous Rossfeld basin fill of the Weitenau syncline revisited (Northern Calcareous Alps, Salzburg)

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The type locality of the Hochreith Formation, which is normally correlated with the Schrambach Formation (late Berriasian to Valanginian) or more likely the basal part of the Rossfeld Formation (late Valanginian to early Hauterivian), should be therefore the basal part of the sedimentary succession of the Early Cretaceous Rossfeld basin fill of the Weitenau syncline east of the type area of the Rossfeld Formation.

To prove the age of these cherty limestones we reinvestigate the type locality of the Hochreith Formation. The change from pure micritic limestones of the Oberalm Formation (Late Tithonian to Berriasian as proven by calpionellids in the Weitenau syncline) as part of the Kimmeridgian to Berriasian Plassen Carbonate Platform in a deep-water setting to the siliclastic influenced cherty limestones (?Hochreith Formation) should be contemporaneous with the drowning of the Plassen Carbonate Platform in Late Berriasian times. Interestingly fine-grained turbidites consist of shallow-water debris and thick mass-flow deposits of the Barmstein Limestones are missed in the Weitenau area. Upsection of the Hochreith Formation the younger (?Hauterivian to Aptian) sedimentary succession shows a coarsening upward trend with an increase of turbidites and mass-flows to the top of the succession.

The well bedded, cherty, bioturbated limestones with marly intercalations of the type locality bear a relatively poor radiolarian assemblage: *Acaeniotyle* sp., *Alievium* cf. *helenae*, *Archaeodictyomitra mitra*, *Archaeodictyomitra sixi*, *Cryptamorphella* cf. *dumitricai*, *Dictyomitra* sp., *Gongylothorax* cf. *favosus*, *Hisocapsa uterculus*, *Pseudodictyomitra* cf. *primitiva*, *Rhopalosyringium* sp., *Sphaerostylus* cf. *squinaboli*, *Tetracapsa* cf. *kaminogoensis*, *Williridellum* cf. *sujkowskii*, *Xitus rectularis*. This radiolarian fauna test the age of the Hochreith Formation as Late Kimmeridgian to Early Tithonian. Therefore a comparison with the Schrambach Formation or the lower Rossfeld Formation is obsolete. In fact the Hochreith Formation underly stratigraphically the Oberalm Formation.

On base of the detection of Late Kimmeridgian-Early Tithonian cherty limestones in the Weitenau syncline below the Oberalm Formation and the upsection following Rossfeld basin-like basin fill the Weitenau syncline cannot directly be compared with the sedimentary succession of the Rossfeld basin fill in the type area of the Rossfeld to the west. Also the comparison with contemporaneous sediments to the north in the Osterhorn group shows a complete different evolution in its basin fill. Here, over the Early Oxfordian to Early Tithonian Tauglboden Formation follow the Oberalm Formation with intercalated Barmstein limestones of Late Tithonian to Berriassian age and further upsection the Schrambach Formation (Late Berriasian-Valanginian) and at least the Rossfeld Formation (Hauterivian-Barremian). In the Weitenau syncline the sedimentary sequence roughly span an age range from Late Kimmeridgian to Aptian. The Hochreith Formation with the accompanying gypsum of the Alpine Haselgebirge should, according to several authors, overly the Late Tithonian Oberalm Formation. Due to our results the Hochreith Formation underly the Oberalm Formation, which gradually pass upsection into siliciclastic sediments with chromium spinell and garnet. Here the lower Rossfeld beds, dated by ammonites as Late Valanginian to Hauterivian contain, in comparison to the Rossfeld Formation of the type locality a complete different spectrum of heavy minerals with hornblende, chromium spinell, garnet and zircon according to previous investigations.

Further investigations on the Weitenau sedimentary succession with matrix dating and component analysis will allow to reconstruct the palaeogeographic provenance of the sedimentary succession as well as the derivation of the clasts (hinterland reconstruction) and the emplacement of the Alpine Haselgebirge (gypsum).

Fahlore reaction textures as a function of fS_2 in the Cu-ore deposits from Schwaz-Brixlegg (Tyrol, Austria)

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The fahlore minig area of Schwaz-Brixlegg in the lower Inn valley (Austria) is located in the northern Austroalpine Greywacke Zone. In the area of Schwaz and Brixlegg the Northern Greywacke Zone consists of Devonian dolomites, Palaeozoic schists and porphyric gneisses. The ore deposits are situated in Devonian dolomite and transgressive overlying Triassic sediments. They are thought to be the result of hydrothermal metal transport in the lower Devonian sedimentation environment with additional younger remobilizations in the Triassic sediments. Within the framework of SFB HiMAT project (historical mining activities in Tyrol and adjacent regions) the mining district of Schwaz Brixlegg plays a key role for the understanding of prehistoric and historic mining in the eastern Alps.

In the fahlore deposit of Groß Kogel near Brixlegg, fahlores texturally occur in three generations. The main fahlores are zoned tetrahedrite-tennantite solid solutions (fahlore I + II), which show reaction textures involving the transformation of fahlores into the assemblage chalcostibite + stibnite + sphalerite + pyrite ± enargite-famatinite ± fahlore III along the model reactions: (e.g. $Cu_{10}Zn_2Sb_4S_{13} + Cu_{10}Zn_2As_4S_{13} + 3\ S_2 \rightarrow 4\ Cu_3AsS_4 + 2\ Cu_3SbS_4 + 2\ CuSbS_2 + 4\ ZnS$, in the Zn system).

In BSE images, the fahlore (I + II) grains show a strong patchy zoning. Sb-rich fahlore I changes to As-rich fahlore II patches along grain boundaries and fractures most likely associated with hydrothermal alteration. Within the fahlore grains are 50-200 µm large reaction areas, which show three different mineral assemblages, 1.) with fahlore III and enargit-famatinite, 2.) without enargite-famatinite but with Fahlore III, and 3.) without fahlore III but with enargite-famatinite. Within these reaction zones, the grain sizes range from 1 µm to 15 µm. The enargite-famatinite grains also show strong chemical As-Sb zoning. Compared to fahlore I and II, fahlore III composition is Sb-richer and As-poorer. The formation of the observed reaction textures is thought to be coupled with either sinking temperatures and/or rising fS_2. Thermodynamic data of fahlore solid solutions are well known but data for the reaction products are very rare. At 300°C and $\log fS_2 = -8.5$ tennantite and S_2 form enargite at the same temperature and at $\log fS_2 = -7.5$ tetraedrite and S_2 form famatinite. Assuming that the temperature of fahlore formation was low (<300°C), the strong variation in the composition of fahlore I and II and the complex solid solutions of both the products and the educts and local variations in the fS_2 conditions most likely result in the formation of compositionally different microdomains.

How many Triassic oceans?

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In recent years the number of independent oceanic basins within the Western Tethys has considerably increased. From an originally single Western Tethys ocean (Laubscher 1971, Bernoulli & Laubscher 1972), especially Stampfli (Stampfli et al. 1991, 1999, Stampfli & Kozur 2006, Stampfli in Moix et al. 2008) has introduced a system of at least four, more or less parallel E-W directed oceanic basins with intermediate small ribbon-continental blocks. These from Ladinian time onward existing oceans are from north to south the Meliata-, Maliac-, Pindos- and Neotethys ocean and are described to represent highly individual Triassic histories in space and time.

Starting from critical key areas for this concept we discuss its strength as well weakness and its reliability. Based on facial, tectonic and paleomagnetic considerations we see no reasons for this multiple splitting of the oceanic Western Tethys end and present arguments for combining at least the Meliata- and the Maliac ocean as well as the Pindos- and the Neotethys ocean into single oceans. Following the concept of Schmid et al. (2008) and Gawlick et al. (2008) for a far distance westward transport of the Pindos ophiolites in combination with their later complicated deformationsl history in their present place, (Vamvaka et al. 2006), all Western Tethys remnants of oceanic crust would fit in a single ocean paleogeography as classically supposed.

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